Remarks

Claims 15-21, 23-25 and 48 are currently pending. Support for the amendments to claims 15 and 48 can be found at, for example, paragraphs [0010] and [0013]. No new matter has been added.

35 U.S.C. § 102

The Examiner rejected claims 15-19, 21, 25-30, 32, 36-41, 43 and 47 under 35 U.S.C. § 102(e) as being anticipated by Ng et al. (US 6,667,360). Applicants traverse this rejection for the following reason.

As amended, claims 1 and 15 of the present application recite a tool in the form of a forming tool which consists of a plastic material with nanoscale particles and a material with gliding properties embedded in the plastic material and a method for converting a metal work piece using such a tool.

While it is true Ng et al. discloses a polymer nanocomposite, Ng et al. fails to disclose a material with gliding properties embedded in the polymer nanocomposite as presently claimed. Since each and every element as set forth in claims 15 and 48 are not found, either expressly or inherently, in Ng et al., claims 15 and 48, and all claims depending on claims 15 and 48, are not anticipated by Ng et al. Accordingly, Applicants respectfully request the rejections under 35 U.S.C. § 102 be withdrawn.

35 U.S.C. § 103

The Examiner also rejected claims 22-24, 33-35 and 44-46 under 35 U.S.C. § 103(a) as being unpatentable over Ng et al. in view of Saigo et al. (US 6,214,277). Applicants traverse this rejection for the following reason.

As noted above, Ng et al. does not teach or suggest incorporating a material with gliding properties into its polymer nanocomposite. The Examiner has added the teachings of Saigo et al. (col. 1, lines 26-27) for the purpose of incorporating a solid lubricant, such as molybdenum disulfide and graphite, into a plastic composite. However, Saigo et al. also teaches "there is a reduction in mechanical properties of the molded part when the above-mentioned solid lubricant is added to the crystalline polymer . . . [and] in the case of molded parts that require high strength . . . various reinforcing fibers, such as glass fibers, carbon fibers or aramide fibers, etc. are further added to the . . . plastic composition." *Saigo et al.* at col. 1, lines 31-39.

Thus, Saigo et al. teaches reinforcing fibers must be combined with solid lubricants in order to provide plastic composites which can be molded and used in high strength applications. Saigo et al. neither teaches nor suggests the high strength of a molded plastic tool could be or would be maintained if reinforcing fibers were also not included. In contrast, Applicants claimed tool does not contain reinforcing fibers. Omission of an element and retention of its function is an indicia of nonobviousness. *See In re Edge*, 359 F.2d 896 (CCPA 1966).

Moreover, the plastic composites disclosed in Ng et al. and Saigo et al. exhibit a low elastic modulus (~ 3 GPa) which is suitable for use as stamps for small electronic components and gears, bearings and sliding parts but not for use as a tool in the form of a forming tool for the deep drawing of large and thick metal work pieces. Nevertheless, Applicants surprisingly found the introduction of nanoparticles increased the elastic modulus of a plastic material from 3 GPa to 11 GPa (see Figure 4 of the present application) making the plastic material suitable for use as a tool in the form of a forming

tool. One of ordinary skill in the art could not have predicted such a result from the combined teachings of Ng et al. and Saigo et al.; thus, the presently claimed invention is not rendered obvious by these publications.

The Examiner also rejected claims 20, 31 and 42 as being unpatentable over Ng et al. in view of Arpac et al. (US 6,291,070) and claims 48 and 49 as being unpatentable over Ng et al. Applicants traverse these rejections for the following reasons.

For the reasons set forth above, Ng et al. neither teaches nor suggests the presently claimed invention. The Examiner has added the teachings of Arpac et al. for the purpose of teaching nanoparticles having a surface modifier. However, Arpac et al neither teaches nor suggests a tool in the form of a forming tool which consists of a plastic material with nanoscale particles and a material with gliding properties embedded in the plastic material and a method of converting a metal work piece using such a tool as presently claimed. Accordingly, Applicants respectfully request the rejections based on Ng et al. and Arpac et al. be withdrawn.

Conclusion

Applicants respectfully submit that the application is now in condition for allowance, and respectfully request an issuance of a Notice of Allowance directed towards the pending claims. Should any fee be due in connection with the filing of this document, the Commissioner for Patents is hereby authorized to deduct said fee from Huntsman Corporation Deposit Account No. 08-3442.

Respectfully Submitted,
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Date: 9/25/08